

REMARKS

Claims 1-31 are pending in the application.

Of the above claims, 20-31 have been withdrawn from consideration.

Claims 1-19 have been rejected.

Claims 1-19 remain in the case for consideration.

Applicant respectfully requests reconsideration and allowance of claims 1-19 for the reasons explained below.

Claim Rejections - 35 USC § 103

Claims 1-19 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Koh - US 6,139,722 and Balasubramanian - US 5,767,004.

Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. 103 of claims 1-19 based upon Koh and Balasubramanian for the following reasons.

In applicants invention a tunnel oxide layer is formed on a semiconductor substrate having self-aligned shallow trench isolation.

Applicant's claim 1 specifically recites:

“forming a tunnel oxide layer on a semiconductor substrate having a self-aligned shallow trench isolation”

Neither the Koh nor the Balasubramanian references teach forming a tunnel oxide layer on a semiconductor substrate having a self-aligned shallow trench isolation.

The Koh reference shows a method of making a memory device wherein a tunnel dielectric layer and a first conductive layer are formed on a semiconductor substrate. Trenches are formed in the semiconductor with isolation oxides that protrude over the substrate. When a sacrificial layer is removed cavities are formed between the isolation oxides. A second conductive layer is conformably deposited over the isolation oxides and along the sidewalls of the cavity. Portions of a second conductive layer are removed and the remaining portions of the second conductive layer and the first conductive layer together serve as a floating gate.

That is, a floating gate is formed by removing portions of a second conductive layer. Portions of the second conductive layer are left behind in the cavity in a self-aligned manner and these portions of the second conductive layer, together with the underlying first conductive layer form a floating gate.

The above is an entirely different process than the applicant's process, which includes, as recited in claim 1:

- (1) forming a tunnel oxide layer on a semiconductor substrate having a self-aligned shallow trench isolation
- (1) depositing a first floating gate layer on the tunnel oxide layer.....; and
- (2) in-situ depositing a second floating gate layer on the first floating gate layer.

The Examiner acknowledges that Koh does not show "in-situ deposit (of) the second silicon gate layer." The Examiner attempts to use the Balasubramanian reference to fill this void.

The Balasubramanian reference certainly does not teach either "forming a tunnel oxide layer on a semiconductor substrate having a self-aligned shallow trench isolation" or "in-situ depositing a second floating gate layer on the first floating gate layer" as recited in applicant's claim.

The above discussion specifically focused on the language in claim 1. However, the above discussion applies equally to each of the applicant's independent claims. Therefore all of applicant's independent claim and the claims dependent on the independent claims are patentable at least for the reasons discussed above and their dependency.

Claims 6, 10 and 14 distinguish from the references for the reasons explained above. Furthermore, claims 6, 10 and 14 specify that the first floating gate layer is formed on the tunnel oxide layer by depositing polycrystalline silicon, and the second floating gate layer is formed on the first floating gate layer by depositing amorphous silicon. Specifically claim 6 recites:

"depositing a doped polycrystalline silicon on the tunnel oxide layerto thereby form a first floating gate layer" and

“in situ depositing a doped amorphous silicon on the first floating gate layto thereby form a second floating gate layer”

No such steps are shown or suggested in the references.

Applicant submits that dependent claims 2-5, 7-9, 11-13 and 15-19 are patentable since the references do not teach or suggest the combinations recited in the parent claims upon which these claims are dependent.

Conclusion

For the foregoing reasons, reconsideration and allowance of claims 1-19 of the application as amended is respectfully requested.

The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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